

Diagnosis and treatment of nasal and ocular allergies: the Allergies, Immunotherapy, and Rhinoconjunctivitis (AIRS) surveys

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ABSTRACT

Background: Allergic rhinoconjunctivitis (ARC) is managed by a number of health care professional specialties, whose practice styles may vary.

Objective: To survey patients and health care professionals about the diagnosis and treatment of ARC.

Methods: The Allergies, Immunotherapy, and Rhinoconjunctivitis (AIRS) surveys were telephone surveys of randomly selected patients and health care professionals in the United States in 2012. Participants were 2,765 people ever diagnosed as having nasal and/or ocular allergies and 500 practitioners in 7 specialties who were treating ARC.

Results: Adult respondents to the patient survey reported that their allergies had been diagnosed most often by physicians in family practice (46%) rather than by allergists/immunologists (17%) or otolaryngologists (11%). Children's allergies had been diagnosed most often by pediatricians (41%) and family practitioners (22%). Most respondents with conditions diagnosed by an allergist/immunologist (94.9%) or otolaryngologist (62.7%) had been given an allergy test, but the test was not given to most patients with conditions diagnosed by family practitioners (61.3%) or pediatricians (64.9%). Most patients (75.8%) were treating their allergies with over-the-counter medications, and 53.5% were taking prescription medications. Allergen immunotherapy was being used by 33% (adult) or 28% (child) patients of allergist/immunologists, 25% (adult) or 24% (child) patients of otolaryngologists, and 8% and 10% of patients of family practitioners and pediatricians, respectively.

Conclusion: Most patients took nonprescription medications for their allergy symptoms or were treated by general practitioners, who did not use allergy testing when diagnosing ARC. Most patients seen by allergist/immunologists and otolaryngologists were evaluated with allergy tests, and most allergen immunotherapy was provided by allergy specialists.

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Introduction

Symptoms of allergic rhinoconjunctivitis (ARC)—the overlapping conditions of allergic rhinitis and allergic conjunctivitis—are

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extremely common. National survey data for 1988–1994 indicated that 30% of the US population had experienced symptoms of ARC in the prior 12 months and 54% tested positive for one or more allergens, most frequently dust mites, northern grasses, and ragweed.^{1,2} The effects of allergic rhinitis symptoms on patients' quality of life have been well documented.^{3–6}

US practice parameters state that allergic rhinitis should be diagnosed on the basis of a patient history, physical examination, and therapeutic trial of pharmacotherapy.⁷ Allergy tests should be considered to provide evidence of an allergic basis for the patient's symptoms, to confirm suspected causes of the patient's symptoms,

or to assess the sensitivity to a specific allergen for avoidance measures and/or allergen immunotherapy. However, little is known about how US health care professionals diagnose ARC. The use of pharmacotherapies for allergic rhinitis has been documented, but these studies focused on nasal symptoms.^{8,9} Ocular allergy symptoms occur in 64% of people with nasal allergies.¹ Some pharmacotherapies for nasal allergies (ie, intranasal steroids and oral antihistamines) show benefit in ocular allergy but are not as effective as topical agents.^{10–12}

The Allergies, Immunotherapy, and Rhinoconjunctivitis (AIRS) surveys examined the management of ARC from the perspectives of health care professionals treating patients with the condition and of patients diagnosed as having nasal and/or ocular allergies. This article describes the methods and results of both patient and health care professional surveys pertaining to the diagnosis and treatment of ARC in the United States.

Methods

Study Design

The AIRS surveys consisted of 2 separate surveys conducted in the United States in 2012: a survey of households (the patient survey) and a survey of health care professionals (the provider survey). For the patient survey, a national probability sample of adults and children was obtained by screening a geographically stratified sample of 20,835 landline households and 13,195 cell phone–only households. The sample frames were constructed using standard random-digit-dialing protocols for landline telephone and cell phone numbers. Adults were interviewed by telephone about their or their child's condition and treatment. In landline households, if there was more than one eligible respondent, a single respondent was randomly selected to interview. In cell phone–only households, if the respondent on the phone was eligible, then he/she was interviewed. If this person was not eligible, an inquiry on eligible children 5 to 17 years of age in the household was made. If the eligible patient was 5 to 17 years of age, the adult most knowledgeable about that patient's allergies was interviewed. Interviews were conducted between February 28 and May 5, 2012, with a mean interview duration of 24.5 minutes. No honorarium was offered.

For the provider survey, the telephone sample frame was based on the American Medical Association Master List and national lists of optometrists, nurse practitioners, and physician assistants. Health care professionals were randomly selected from the frames stratified by specialty. If selected, a letter was sent before the first attempt to reach the health care professional via telephone. This letter explained the survey, mentioned the \$50 honorarium for completing the survey, and provided a toll-free contact number. Abt SRBI Inc conducted both AIRS surveys.

Survey Respondents

The patient sample consisted of adults and children 5 years or older who had ever been diagnosed by a health care professional as having hay fever, allergic rhinitis, rhinoconjunctivitis, nasal allergies, or eye allergies and who had symptoms of sneezing, itching, watery eyes, nasal congestion, or other nasal or ocular allergy symptoms in the past 12 months or who were taking any medication for hay fever, rhinitis, or nasal allergies. The list of possible diagnoses was chosen to reflect terms that were likely to be used by health care professionals and recognized by patients with ARC.

The provider sample consisted of 500 health care professionals who offered direct outpatient care to at least one ARC patient per week. The sample consisted of 100 physicians specializing in allergy/immunology, 100 in otolaryngology, 75 in family medicine, 75 in pediatrics, and 50 in ophthalmology/optometry, in addition to 50 nurse practitioners and 50 physician assistants.

Table 1

Characteristics of the study patients

Characteristic	Patients, % (n = 2,765)
Female	54.4
Age, y	
5–11	12
12–17	14
18–24	5
25–34	8
35–44	14
45–54	19
55–64	17
≥65	11
Diagnosis	
Nasal allergies	85.6
Hay fever	58.7
Eye allergies	54.3
Allergic rhinitis	29.6
Rhinoconjunctivitis	13.4
Age at diagnosis, y	
<12	43.7
12–17	15.9
>18	35.7
Not known	4.8
Comorbidities	
Asthma	
Yes, past 12 months	20.9
Yes, ever	13.8
Sinusitis or sinus problems	
Occasionally	44.9
All or most of the time	25.9
Ear problems	
Every month	8.9
Every 6 months	15.8
Every year	13.8
Race/ethnicity	
Hispanic	8
White	73
Black or African American	12
Asian	2
American Indian or Alaska Native	2
Mixed/other	1
Employment status	
Full time	47.2
Part time	9.1
Home maker, student, or military	11.8
Unemployed or retired	24.0
Household income	
<\$35,000	27
\$35,000–<\$50,000	15
\$50,000–<\$75,000	17
\$75,000–<\$100,000	11
>\$100,000	17
Not reported	13
Highest level of education	
Less than high school	6
High school graduate	20
Some college/associate's degree	31
Bachelor's degree	24
Graduate degree	18

Questionnaires

The AIRS patient survey included questions about the respondent's or their child's demographic and socioeconomic characteristics, specific diagnosis, and comorbidities (see eMethods in the online supplement). Respondents were asked the type of medical professional seen most often for their or their child's allergies (physician or nurse practitioner or physician assistant), the medical specialty of the physician, the medical specialty of the physician who first diagnosed them as having allergies, whether a physician or other health care professional had ever given them or their child an allergy test to see what caused their allergies, when they or their child had most recently received an allergy test, and whether the allergy test was a skin or blood test. Respondents were

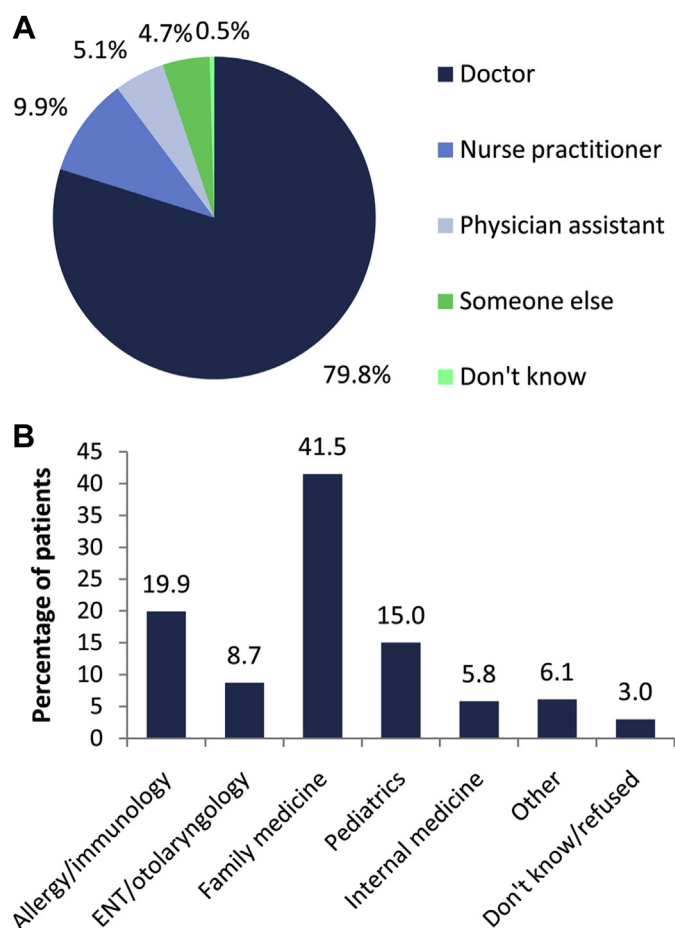


Figure 1. Type of health care professional seen for allergies (A) and specialties of physicians seen for allergies (B). A, Patient survey question 27: “Who do [you/your child] see [most often] for [your/his/her] allergies?” B, Patient survey question 28: “What is the medical specialty of the doctor that (you see/your child sees) most often for (your/his/her) allergies?”

also asked whether they had used over-the-counter and prescription medicines for allergies in the past year, the names of the medications, and whether their or their child's physician or health care professional had ever given them a series of allergy injections or prescribed allergy drops to treat their or their child's allergies.

The AIRS provider survey collected information about the health care professional's practice characteristics (see [eMethods](#)). Health care professionals were asked how many outpatients with ARC they saw per week, whether they diagnosed patients as having suspected ARC or referred them for diagnosis, whether they conducted a skin or blood test in the office when making or confirming a diagnosis of ARC, whether their patients had completed 3 years of allergen immunotherapy, and reasons for completing or not completing 3 years of allergen immunotherapy. Demographic information was also recorded.

Statistical Analysis

Weights were developed to correct for nonresponse bias and to adjust the sample to match the target population.³ Weighting was based on the National Health Interview Survey's data on those with hay fever. Demographic variables used in weighting were age, sex, and telephone status (whether landline or cell phone–only households). A descriptive analysis of data was conducted, with question responses expressed as the percentage of respondents. A χ^2 analysis was used to test the significance of the distribution of types of allergy tests (skin, blood, both, or neither) across all

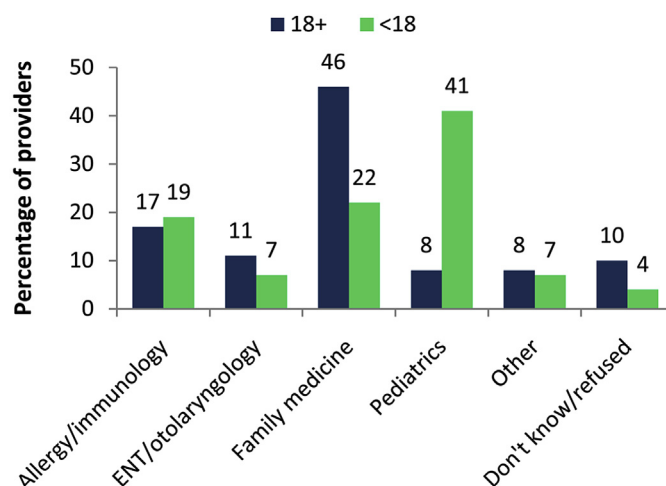


Figure 2. Specialty that diagnosed allergies, as reported by patients. Patient survey question 8: “What was the medical specialty of the doctor who first diagnosed you with allergies?” Other includes asthma specialist, dermatologist, emergency department physician, internal medicine, ophthalmologist/optometrist/eye doctor, pulmonologist, nurse practitioner, physician assistant, and other unclassifiable (eg, medical doctor).

specialties and between allergists/immunologists and all other specialties combined.

Results

Patient Survey

Patient characteristics

A total of 20,835 landline households were screened, in 3,765 of which resided a person with ARC, for a household prevalence of 18.1%. An additional 13,195 cell phone–only households were screened. Interviews were completed by 2,172 respondents in landline households (response rate, 57.7%) and 593 in cell phone–only households. The patient survey thus included 2,765 individuals 5 years and older.

Twenty-six percent of patients were younger than 18 years, and 54.4% were female ([Table 1](#)). The reported diagnoses were nasal allergies (85.6%), hay fever (58.7%), eye allergies (54.3%), allergic rhinitis (29.6%), and rhinoconjunctivitis (13.4%). Comorbid asthma had been diagnosed in 13.8%, 25.9% reported constant sinus problems, and 8.9% reported monthly ear problems.

Specialties providing care for patients' allergies

A total of 1,264 respondents to the patient survey (46%) had seen a health care professional specifically about their or their child's allergies in the past year. Of these, 79.8% most often visited a physician, and 15.0% visited a nurse practitioner or physician assistant ([Fig 1A](#)). The medical specialties of the physicians seen were most frequently family practice (41.5%), allergy/immunology (19.9%), and pediatrics (15.0%; [Fig 1B](#)). Respondents reported that children younger than 18 years most frequently had their conditions diagnosed by pediatricians (41% vs 4%–22% with conditions diagnosed by other specialties), and adults had conditions diagnosed most frequently by family practitioners (46% vs 8%–17% with conditions diagnosed by other specialties; [Fig 2](#)).

Allergy testing

Almost half (46.6%) of respondents to the patient survey reported that they (or their child) had never been given an allergy test by a health care professional ([Fig 3A](#)). Of those who had been given an allergy test, 71.3% had been given a skin test, 13.4% a blood test, and 12.5% had both ([Fig 3B](#)). Most patients diagnosed as having allergies by an allergist (94.5%) or otolaryngologist (61.8%) had

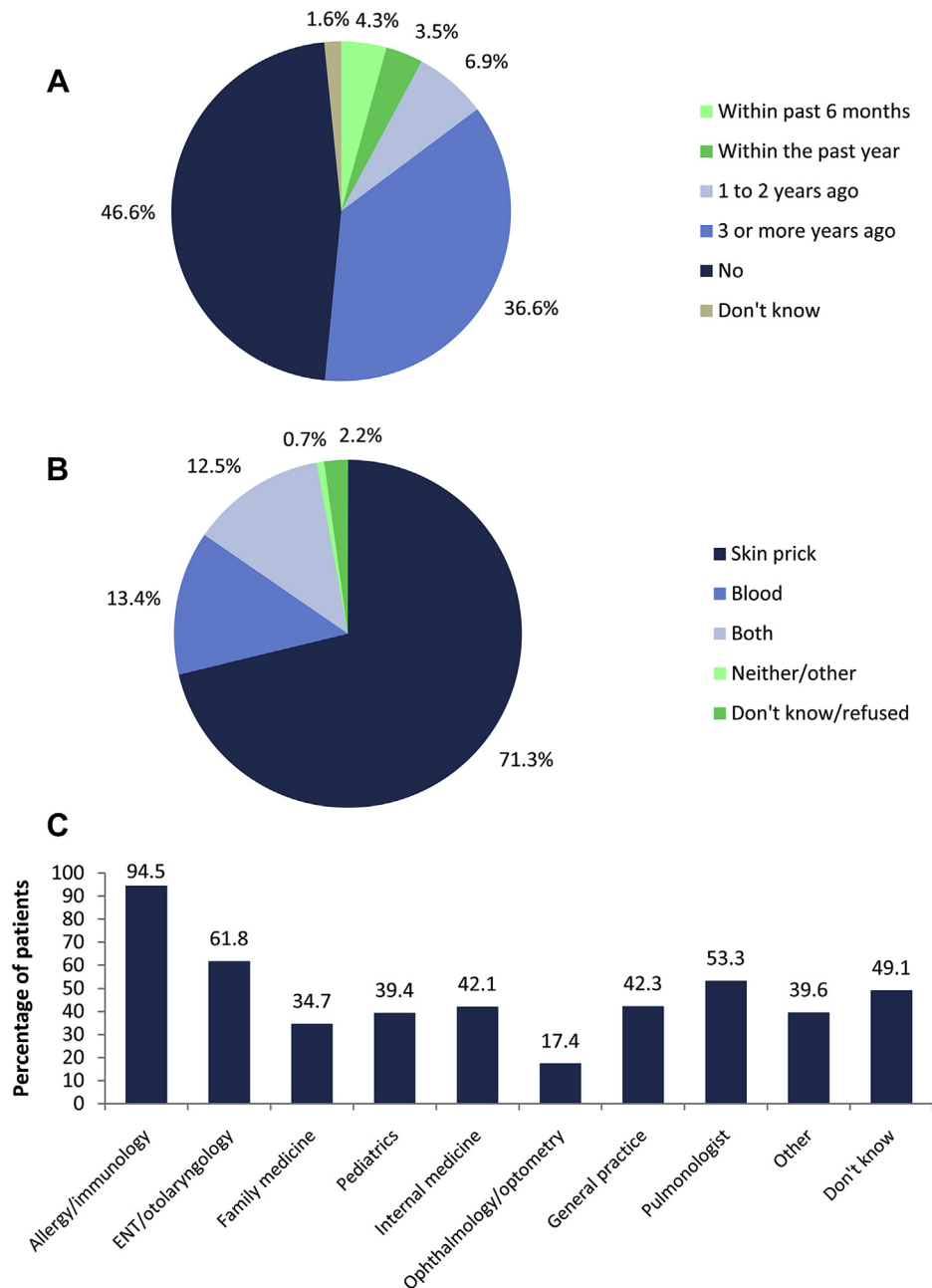


Figure 3. Allergy testing as reported by patients: Ever had an allergy test (A), type of test (B), and percentage of patients tested (C), by specialty of diagnosing health care professional. A, Patient survey question 23a: “Has a doctor or other health professional ever given [you/your child] an allergy test to see what causes your/his/her] allergies?” Patient survey question Q23b: “When did [you/your child] most recently have an allergy test?” B, Patient survey question 23c: “Thinking of the allergy testing that took place, was it a skin prick test or a blood test?” C, Convergence of patient survey questions 23a and Q8: “What was the medical specialty of the doctor who diagnosed you with allergies?”

received an allergy test (Fig 3C). Only a few patients with conditions diagnosed by generalists had ever received an allergy test: family medicine (34.7%), pediatrics (39.4%), and general practice (42.3%). Most respondents (92.0%) reporting an allergy test were told that the result was positive, whereas 4.4% were told that the result was negative. Most (96.3%) respondents reporting a positive allergy test result were told the allergens to which they were allergic.

Treatment of allergies

Most respondents to the patient survey (75.8%) reported that they (or their child) had taken over-the-counter medications to relieve their allergy symptoms in the prior year (Fig 4), most frequently antihistamines (88%), decongestants (10%), and

nonsteroidal anti-inflammatory drugs (4.1%; Table 2). Approximately half of all respondents (53.5%) reported that they (or their child) had taken prescription medications (Fig 4), most frequently intranasal steroid sprays (43.1%), leukotriene receptor antagonists (15.9%), and oral corticosteroids (7.0%; Table 2). A small percentage (3.8%) reported using their β -agonist inhaler for their nasal allergies. Only 21.7% had ever been given allergen immunotherapy (Fig 4).

Provider Survey

Provider characteristics

A total of 500 health care professionals participated in the provider survey (Table 3). Most health care professionals (59%)

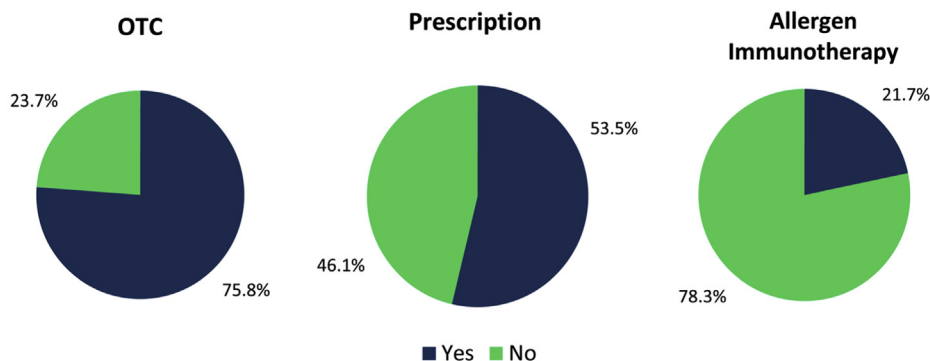


Figure 4. Treatments used by patients with allergic rhinoconjunctivitis. Patient survey question M2a: “In the past 12 months, [have you/has your child] used any over-the-counter, non-prescription medicine to give [you/him/her] relief from allergy symptoms?” Patient survey question M1a: “In the past 12 months, [have you/has your child] used any prescription medication for [your/his/her] allergies?” Patient survey question I5a: “Has [your/your child’s] doctor or healthcare professional ever given [you/him/her] a series of allergy shots which are used to treat allergies?” Patient survey question I5b: “Has [your/your child’s] doctor or healthcare professional ever prescribed [you/him/her] daily allergy drops to be placed under the tongue to treat [your/his/her] allergies?”

were male. Health care professionals reported seeing means of 26 adult outpatients and 16 children per week with ARC (Table 3). Most health care professionals (75.4%) had been practicing for more than 12 years.

Diagnosis of allergies

Most health care professionals reported that they diagnosed ARC without referral: 77% of nurse practitioners/physician assistants, 88% of ophthalmologists/optometrists, 89% of otolaryngologists, 91% of pediatricians, 97% of family doctors, and 100% of allergist/immunologists.

Most allergists/immunologists (94.9%) and otolaryngologists (62.7%) reported that they conducted skin and/or blood tests for common allergens when making or confirming a diagnosis of ARC (Fig 5). In contrast, most other specialties conducted neither skin nor blood tests when diagnosing ARC: 61.3%, 64.9%, and 96.0% in family medicine, pediatrics, and ophthalmology/optometry, respectively, and 71.9% of nurse practitioners/physician assistants (Fig 5). The distribution of the use of allergy tests when making or confirming a diagnosis of ARC differed significantly across all

specialties ($P < .001$) and between allergists/immunologists and all other specialties combined ($P < .001$).

Treatment with allergen immunotherapy

Health care professionals reported that 7% to 33% of their ARC patients were currently using allergen immunotherapy, depending on the specialty. Allergists/immunologists reported that 33% of their adult and 28% of their child ARC patients were currently using allergen immunotherapy. Otolaryngologists reported that 25% and 23%, respectively, of their adult and child ARC patients were currently using allergen immunotherapy. The other health care professional specialties reported current use of allergen immunotherapy by 7% to 14% of their ARC patients. Approximately one-third of health care professionals reported that most of their adult (34%) or child (31%) patients completed 3 years of allergen immunotherapy. Most health care professionals (61%) reported that the reason some patients did not complete at least 3 years of allergen immunotherapy was “inconvenience,” 25% thought the reason was “cost,” whereas 17% thought the reason was “effectiveness.”

Discussion

The AIRS patient and provider surveys are the first nationwide studies designed to address the diagnosis and treatment of ARC in

Table 2
Over-the-counter and prescription drugs taken by patients, by drug class

Drug class	Patients, % (n = 2,765) ^a
Over-the-counter drugs ^b	
Antihistamine	88.0
Decongestant (oral)	10.0
Nonsteroidal anti-inflammatory	4.1
Antihistamine and decongestant	3.4
Expectorant	2.9
Prescription drugs ^c	
Intranasal steroid spray	43.1
Leukotriene receptor antagonists	15.9
Oral corticosteroids	7.0
β -Agonist	3.8
Antihistamine	
Oral	4.4
Nasal spray	3.5
Eye drops	2.2

^aPercentage of patients taking over-the-counter drugs (n = 2,325) and percentage of patients taking prescription drugs (n = 1,266).

^bPatient survey question M2c: “What are the names of the over-the-counter medicines [you/he/she] [take(s)/took] for allergies?” Multiple response base: Respondents who have used over-the-counter medicine for allergies within the past year or reported over-the-counter when asked about prescription drugs.

^cPatient survey question M1c: “What is the name of the prescription medications [you/your child] [take/took] for allergies?” Multiple response base: Respondents who have used prescription medication for allergies within the past year and did not report use of only over-the-counter.

Table 3
Characteristics of health care professionals

Characteristic	Health care professionals, No. (%) (n = 500) ^a
Specialty	
Allergy/immunology	100 (20.0)
Otolaryngology	100 (20.0)
Family medicine	75 (15.0)
Pediatrics	75 (15.0)
Ophthalmology/optometry	50 (10.0)
Nursing practitioner/physician assistant	100 (20.0)
Male	295 (59.0)
Mean No. of allergic rhinoconjunctivitis patients seen per week (range among specialties) by age, y	
≥18	26 (11-54)
<18	16 (6-31)
Year graduated or received license	
2010-11	4 (0.8)
2000-2009	118 (23.6)
1990-1999	142 (28.4)
1980-1989	110 (22.0)
1970-1979	92 (18.4)
<1969	33 (6.6)

^aValues are presented as number (percentage) unless indicated otherwise.

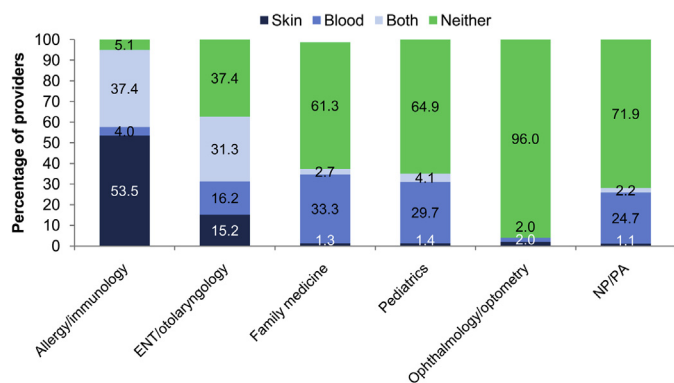


Figure 5. Types of allergy tests given by health care professionals, by specialty. Provider survey question 5a: “When making or confirming a diagnosis of allergic rhinoconjunctivitis... Do you conduct a skin test in your office?” Provider survey question 6: “Do you conduct a blood test?” The distribution of allergy tests differed significantly across all specialties by χ^2 analysis ($P < .001$) and between allergists/immunologists and all other specialties combined ($P < .001$).

the United States. The prevalence of ARC found in the patient survey (18.1%) agreed well with the previously reported prevalence of physician-diagnosed allergic rhinitis (14.1%),³ although because it was a household prevalence, it may have underestimated the number of individuals with ARC.

Three quarters of respondents to the patient survey were treating their allergy symptoms with over-the-counter medications, most often antihistamines, whereas one-fifth reported the use of prescription intranasal steroid sprays. These results are similar to those of the National Allergy Survey Assessing Limitations, in which two-thirds of patients reported using over-the-counter medications for their allergic rhinitis, whereas one-third had used nasal steroids.⁹ Fewer than half of respondents to the AIRS patient survey had seen a health care professional specifically about their allergies in the prior year. When they had seen a health care professional, it was usually a nurse practitioner, physician assistant, family physician, or pediatrician. Results of the provider survey indicated that most of these health care professionals diagnosed ARC without referral to an allergy specialist. Hence, more than half of diagnoses of ARC were made by family physicians or pediatricians.

In the AIRS provider survey, almost two-thirds of physicians in family medicine and pediatrics diagnosed ARC without conducting an allergy test. In the AIRS patient survey, approximately half of those diagnosed as having ARC had never been given an allergy test. These data are consistent with results of the Quest Diagnostics study of allergy blood testing in the United States in 2005–2008,¹³ in which only 16% of primary care physicians and 33% of pediatricians had ordered an allergy blood test, whereas 71% of allergy specialists had ordered one.¹³

Almost all allergists/immunologists reported conducting an allergy test when making or confirming a diagnosis of ARC, with 91% performing skin testing as part of the evaluation. In the AIRS patient survey, almost all patients with conditions diagnosed by an allergist/immunologist and two-thirds of those with conditions diagnosed by an otolaryngologist reported being given an allergy test. This is, perhaps, not surprising because patients may have been referred to these specialists after failing to respond to conventional allergy therapies. As expected, then, allergy specialists performed a more thorough evaluation, and it is likely that they tailored treatment of the individual patient, especially in regard to environmental allergen control measures, prescription of appropriate medications, and provision of specific allergen immunotherapy.

Approximately one-third of allergists/immunologists' ARC patients and one-quarter of otolaryngologists' ARC patients were currently using allergen immunotherapy vs small minorities of

generalists' ARC patients. Only one-fifth of respondents to the AIRS patient survey reported the use of allergen immunotherapy. Results of the AIRS surveys detailed elsewhere (unpublished data) indicate that patients who had received a recommendation for allergen immunotherapy received it largely from allergy specialists and rarely from generalists. Most patients who had received allergy immunotherapy injections, which was the dominant mode of administration, had received them from allergists.

Most respondents to the AIRS patient survey who had been given an allergy test had been given it more than 3 years previously. This finding is consistent with the allergy test being given at the time of diagnosis because most respondents were 5 to 18 years old when their conditions were diagnosed, whereas most were adults older than 25 years at the time of the AIRS survey. This finding also explains the observation that 8% of adult respondents to the AIRS patient survey had their conditions diagnosed by a pediatrician. Although this finding also suggests the possibility of a recall bias, the results of the AIRS patient survey with regard to allergy testing and the health care professional specialties seen consistently agreed with those of the AIRS provider survey. However, it is a limitation that the proportion of health care professionals contacted who responded to and completed the survey was not reported, so that the representativeness of the AIRS provider samples is unclear.

Another limitation is the lack of clinical confirmation of the diagnosis of ARC, which left the presence or absence of this condition open to the interpretation of individual patients and health care professionals. This, in combination with the finding that many patients with ARC symptoms have only nonallergic triggers or have mixed rhinitis with both allergic and nonallergic causes,¹⁴ means that the diagnosis of ARC is uncertain in many of the AIRS survey respondents. In addition, the AIRS patient survey excluded patients without a health care professional's diagnosis of ARC, so the extent of over-the-counter use of medications for nasal and ocular allergies might have been underestimated. The effectiveness of medications used to treat allergy symptoms was not assessed. Finally, although the provider survey specified ARC, how health care professionals interpreted this term was not determined (ie, whether they interpreted it as allergic rhinitis and allergic conjunctivitis combined or as allergic rhinitis and/or allergic conjunctivitis). The latter was the requirement for inclusion in the patient survey. It is not clear, then, to what extent the diagnoses in the 2 surveys overlapped.

In conclusion, most individuals diagnosed as having ARC were managed by generalists—nurse practitioners, physician assistants, or physicians in family medicine or pediatrics—and took over-the-counter medications for allergy symptom relief. Most of these people were not allergy tested when their conditions were diagnosed. Almost all patients seen by allergists/immunologists and two-thirds of those seen by an otolaryngologist were fully evaluated with allergy tests. Only 1 in 5 people diagnosed as having ARC had been treated with allergen immunotherapy, provided largely by allergy specialists.

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Supplementary Data

Supplementary data related to this article can be found at <http://dx.doi.org/10.1016/j.anai.2014.02.006>.

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eMethods

Patient Survey Questions

Question L1: Including yourself, how many persons, 5 years and older, live in your household?

Question L2: Have you ever been diagnosed as having hay fever, allergic rhinitis, rhino-conjunctivitis, nasal or eye allergies?

Question L3: Of the [answer to L1] people 5 years or older living in your household, how many have ever been diagnosed as having hay fever, allergic rhinitis, rhinoconjunctivitis, nasal or eye allergies?

Question L4: [Has this person/have any of them] had symptoms such as sneezing, itching, runny nose, watery eyes, nasal congestion, or other nasal or eye allergy symptoms in the past 12 months?

Question L5: [Does this person/do any of them] take any medication for their hay fever, allergic rhinitis, rhino-conjunctivitis, nasal or eye allergies?

Question 4a: Not counting nasal allergies and sinus problems, (do you/does your child) suffer from any other lung or breathing conditions? 4b. What are those other lung or breathing conditions? Anything else? (possible answers: α_1 -antitrypsin deficiency, bronchitis, chronic obstructive pulmonary disease [COPD], cystic fibrosis, emphysema, lung cancer, pneumonia, sleep apnea, snoring, other (specify), don't know, refused)

Question 5a: (Do you/does your the child) have any other chronic or serious health conditions? 5b. What are those other chronic health conditions? Anything else? (possible answers: arthritis, cancer, chronic bronchitis, chronic obstructive pulmonary disease [COPD], depression, diabetes, ear infection, emphysema, eczema, heartburn/reflux/GERD, heart disease, hypertension/high blood pressure, hyperactivity (ADHD), migraine, headaches, sleep apnea snoring, other (specify), don't know, refused)

Question 7: At what age (were you/was your child) first diagnosed as having allergies, rhinitis or hay fever?

Question 8: What was the medical specialty of the physician who first diagnosed you as having allergies? Other includes asthma specialist, dermatologist, emergency department physician, internal medicine, ophthalmologist/optometrist/eye doctor, pulmonologist, nurse practitioner, physician assistant and other unclassifiable (eg, medical doctor).

Question 17: Are you currently employed full time, employed part time, in the military, unemployed, retired, a student, a homemaker or something else?

Convergence of questions 23a and 8: "What was the medical specialty of the doctor who diagnosed you with allergies?"

Question 23a: Has a physician or other health professional ever given [you/your child] an allergy test to see what causes your/his/her allergies? 23b. When did [you/your child] most recently have an allergy test? 23c. Thinking of the allergy testing that took place, was it a skin prick test or a blood test?

Question 27: Who do [you/your child] see [most often] for [your/his/her] allergies?

Question 28: What is the medical specialty of the physician who (you see/your child sees) most often for (your/his/her) allergies?

Question M1a: In the past 12 months, [have you/has your child] used any prescription medication for [your/his/her] allergies?

Question M2a: In the past 12 months, [have you/has your child] used any over-the-counter, nonprescription medicine to give [you/him/her] relief from allergy symptoms?

Question I5a: Has [your/your child's] physician or health care professional ever given [you/him/her] a series of allergy shots which are used to treat allergies? I5b. Has [your/your child's] physician or health care professional ever prescribed [you/him/her] daily allergy drops to be placed under the tongue to treat [your/his/her] allergies?

Question PH1: Do you personally or do any other adults in your household have a working cell phone?

Question PH2: Of all of the phone calls that you or your family receives, are... (possible answers: all or almost all calls received on cell phones, some received on cell phones and some received on land lines, very few or none on cell phones, don't know, refused)

Question D1: What is your age?

Question D2: Are you male or female?

Question D3: What is the highest level of school that you've completed? (possible answers: 8th grade or lower, some high school, did not graduate, high school graduate or GED, some college, no degree, associate (2 year) degree, bachelor's (4 year) degree, graduate degree (master's/PhD), not sure, refused)

Question D4: Are you of Hispanic origin or descent?

Question D5: Do you consider yourself to be white, black, African American, Asian, American Indian, Alaska Native, Native Hawaiian, or other Pacific Islander?

Question D7: Which of the following categories best describes your 2011 household income before taxes... (possible answers: <\$35,000, \$35,000-\$49,999, \$50,000-\$74,999, \$75,000-\$99,999, >\$100,000+, don't know, refused)

Provider Survey Questions

Question D1: In what year did you (IF VER=1: graduate from medical or osteopathic school/IF VER=2: receive your license as a nurse practitioner/ IF VER=3: receive your license as a physician assistant)?

Question D2: Have you taken any continuing medical education (CME) courses related to the management and treatment of allergic rhinoconjunctivitis (IF VER=1: since medical school/ IF VER=2 OR 3: since receiving your license)?

Question D3: Did any of these CME courses on allergic rhinoconjunctivitis provide specific guidance on how immunotherapy should be prescribed?

Question D4: How do you obtain new information regarding immunotherapy? Any other ways? (possible answers: journals (print or electronic), websites, professional meetings, colleagues, mobile communication channels, pharmaceutical companies/representatives, other (specify), don't know, refused)

Question 1: What is your primary specialty? (possible answers: allergy and/or immunology, family medicine, internal medicine, otolaryngology/ear-nose-throat, ophthalmology, obstetrics-gynecology, optometry, pediatrician, other (specify), don't know, refused)

Question 3a: In an average week, about how many allergic rhinoconjunctivitis patients 18 years or older do you see on an outpatient basis? 3b. In an average week, about how many allergic rhinoconjunctivitis patients younger than 18 years do you see on an outpatient basis?

Question 4: Do you diagnose patients as having suspected allergic rhinoconjunctivitis or do you refer them for diagnosis? (possible answers: diagnose, refer, both, neither, don't know, refused)

Question 5a: When making or confirming a diagnosis of allergic rhinoconjunctivitis, do you conduct a skin test in your office? 5b. Are the skin tests performed as a prick, puncture, or intradermal?

Question 6: When making or confirming a diagnosis of allergic rhinoconjunctivitis, do you conduct a blood test?

Question IT8: Of your adult patients with allergic rhinoconjunctivitis who have ever been on immunotherapy, how many have completed a minimum of 3 years immunotherapy? Would you say all, most, some, few, or none?

Question IT16: Why do you think some patients, of any age, do not complete the immunotherapy treatment course? Anything else? (possible answers: symptoms stopped, doctor recommendation, inconvenience of immunotherapy, insurance coverage, cost, ability to customize, effectiveness, relocated/moved, side effects, other (specify), don't know, refused.)